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| 10/017,207 | 12/13/2001 | Michael Louis Frank | 10011303-1 | 1184 |

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| EXAMINER | |
|---|---|
| JAGANNATHAN, MELANIE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2616 | |

DATE MAILED: 07/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/017,207 | FRANK, MICHAEL LOUIS | |
| | Examiner | Art Unit | |
| | Melanie Jagannathan | 2616 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 9-13, 15-20, and 22 are rejected under 35 U.S.C. 102 (e) as being anticipated by Tikka et al. (US Pub. No. 2003/0060170 Al), hereafter Tikka.

In regards to claims 1, 3, 13, 16, 18, 20, and 22,

Referring to Figure 5, Tikka discloses a duplexer 102 that comprises a single-ended port 120' (paragraph [0053]; claims 1 and 16 - an input/output line); a transmit segment that connects to a single-ended port 120' (paragraph [0053]; claims 1 and 16 - a transmit segment connected to the input/output line); and a receive segment (claims 1 and 16 - a receive segment).

Tikka discloses a receive segment that includes a balun 70 connected to a single ended port 120' (paragraph [0053]; claims 1 and 16 – a balun connected to the input/output line). The balun includes a first output and a second output (Figure 5; claims 1 and 16 – a balun including a first output and a second output, a first transmission line coupled between the single-ended port 120' and a first output (Figure 5; paragraph [0053]; claims 1 and 20 - a first transmission line coupled between the input/output line and the first output), and a second transmission line coupled between the single-ended port 120' and the second output (Figure 5; paragraph [0053]; claims 1 and 20 – **a** second transmission line coupled between the input/output line and the second output).

Tikka also discloses a receive segment that includes a passband filter 10' connected to the first output and the second output (Figure 5; claims 1 and 16 - a differential filter connected to the first output and the second output), the passband filter 10' including resonator elements (Figure 5; paragraph [0048]; claims 1 and 22 - the differential filter including resonator elements connected).

Tikka also discloses a passband filter 10', in which two series resonators are used to provide balanced ends, and two shunt resonators are connected to

the series resonators in a crisscross fashion to form a differential or balanced topology. This lattice structure would enable the differential filter 10' to short the first output and the second output at transmit band frequencies of the duplexer (Figure 2; Abstract; paragraphs [0048] and [0052]; claims 1, 3, 13, 16, 18, and 22 - at transmit band frequencies of the duplexer, the first output and the second output are shorted to each other).

In regards to claims 2, 12, and 17,

Referring to Figure 1, Tikka discloses a phase shifter 934 that includes one output to be shorted to ground at transmit band frequencies (paragraph [0003]; claims 2, 12, and 17 - at transmit band frequencies of the duplexer, the first output and the second output are each shorted to a reference voltage.

In regards to claim 4,

Referring to Figure 1, Tikka discloses a duplexer that has elements 901, 907, 915, and 925 arranged in a paired half ladder structure (paragraph [0003]; claim 4 - the resonator elements are arranged so that the differential filter includes resonator elements arranged in a paired half ladder structure).

In regards to claim 5,

Referring to Figure 1, Tikka discloses a duplexer that has elements 905, 934, and 911 arranged in a full ladder structure (paragraph [0003]; claim 5 - a duplexer that includes the resonator elements arranged so that the differential filter includes resonator elements arranged in a full ladder structure).

In regards to claim 6,

Referring to Figures 2 and 5, Tikka discloses a differential filter that includes resonators arranged in a lattice structure (paragraph [0048]; claim 6 - the differential filter includes resonator elements arranged in a lattice structure).

In regards to claim 7,

Referring to Figure 1, Tikka discloses a duplexer that has elements 901, 907, 915, and 925 arranged in a paired half ladder structure and has elements 905, 934, and 911 arranged in a full ladder structure (paragraph [0003]; claim 7 - the resonator elements are arranged so that the differential filter includes resonator elements arranged in both a paired half ladder structure and a full ladder structure).

In regards to claims 9, 15, and 19,

Referring to Figure 5, Tikka also discloses a passband filter 10, in which two series resonators are used to provide balanced ends, and two shunt resonators are connected to the series resonators in a crisscross fashion to form a differential or balanced topology. This lattice structure would enable the short circuit provided by a passband filter 10 to be transformed into an open circuit through the utilization of transmission line inside a balun 70 (paragraphs [0048] and [0053]; claims 9, 15, and 19 - the transmit segment includes single ended filter including resonator elements connected so that at receive band frequencies of the duplexer, an open circuit is presented by the single ended filter to the input/output line).

In regards to claim 10,

Referring to Figure 5, Tikka discloses a lattice FBAR duplexer 102 that can be fabricated using a normal FBAR process (paragraph [0055]; claim 10 — a duplexer as in claim I wherein the resonator elements are each implemented as a film bulk acoustic resonator (FBAR)).

In regards to claim 11,

Referring to Figure 5, Tikka discloses a passband filter 10 connected to a single-ended antenna 66 via a balun (paragraphs [0052], [0053], and [0058]; claim 11 - signals at the transmit band frequencies providing passband transmission through a single-ended filter of the duplexer).

Tikka also discloses a passband filter 10', in which two series resonators are used to provide balanced ends, and two shunt resonators are connected to the series resonators in a crisscross fashion to form a differential or balanced topology. This lattice structure would enable the differential filter 10' to short the first output and the second output at transmit band frequencies of the duplexer (Figure 2; Abstract; paragraphs [0048] and [0052]; claim 11 - providing a short circuit at a first input and second input of a differential filter).

Tikka also discloses a first input and second input of a differential filter 10' connected to an input/output line 120' of a duplexer 102 via a balun 70 (Figure 5; paragraph [0053]; claim 11 - the first input of the differential filter being connected to an input/output line of the duplexer via a balun and the second input of the differential filter being connected to the input/output line of the duplexer via the balun).

Referring to Figure 5, Tikka discloses a receive segment that has a passband filter 10' connected to a single-ended antenna 66 via a balun (paragraphs [0052], [0053], and [0058]; claim 11 – signals at the receive band frequencies providing passband transmission through the differential filter of the duplexer).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 8, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tikka, in view of Bartholomew (US Pat. No. 5,818,385).

In regards to claims 8, 14, and 21,

Referring to Figure 5, Tikka discloses a balun 70 that is coupled between the single-ended port 120' and a first output (paragraph [0053]; claim 21 - a first

transmission line coupled between the input/output line and the first output), and also between the single-ended port 120' and the second output (paragraph [0053]; claim 21 – a second transmission line coupled between the input/output line and the second output).

Tikka discloses a phase shifter that provides a 90° phase-shift to signals conveyed to or from the third port 130 of the receiver. The phase shifter 90 can be constructed from a transmission line (paragraphs [0049] and [0050]; claims 8, 14, and 21 – a length of the first transmission line is chosen to cause a phase delay of approximately one fourth wave length at receive band frequencies of the duplexer).

Tikka discloses the above limitations of claims 1, 8, 14, and 21 but it does not disclose a length of the second transmission line (within the balun) that is chosen to cause a phase delay of approximately three fourths wave length at receive band frequencies of the duplexer.

Referring to Figure 9, Bartholomew discloses a first means for delaying phase 102 that uses a series of resonant inductor-capacitor circuit to delay phase by one-quarter wavelength (i.e. 90 degrees). One or more additional series resonant circuits may be cascaded with the existing series resonant circuit to increase the total phase delay (column 23, lines 54-59; column 27, lines 27-36; claims 8, 14, and 21 - a length of the second transmission line is chosen to cause a phase delay of approximately three fourths wave length at receive band frequencies of the duplexer).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the duplexer of Tikka by having the first and the second transmission lines providing a phase delay of approximately one-fourth wavelength and of approximately three-fourths wavelength, respectively, as shown by Bartholomew. This would provide the means for processing a signal for a duplexer (Bartholomew; column 12, lines 43-45; column 22, lines 37-39).

***Response to Arguments***

5. Applicant's arguments filed 11/15/2005 have been fully considered but they are not persuasive.

Regarding claims 1 and 16, Applicant argues reference Tikka does not disclose or suggest a separate transmit segment connected to port 120' of duplexer. Examiner respectfully disagrees and contends transceiver (element 110) is connected to 120' so the lines connecting to correspond to a separate transmit segment than lines connecting down to transceiver (element 130).

Regarding claims 1 and 11, Applicant argues reference Tikka does not disclose or suggest that at transmit band frequencies of the duplexer, the first output and the second output of the balun are shorted. Examiner respectfully disagrees. Tikka discloses passband filters include series and shunt resonators to provide shorting of signals through filter. The first passband filter (element 10) and the second passband filter (element 10') have different passband frequencies for GSM1800 and PCS1900. Thus, passband filter (element 10) can short both signals coming from balun (element 70) after they have been outputted from balun, preventing any output of signals out of filter to transceiver (element 110).

Regarding claim 11, Applicant argues Tikka does not disclose or suggest use of a single-ended filter for passband transmission of signals. Examiner respectfully disagrees. Examiner contends, in light of claim language, Tikka discloses passband filter (element 10') is used just for PCS passband frequencies.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJ
7/20/2006

CHI PHAM
SUPERVISORY PATENT EXAMINER 7/24/06